

ZOOLOGY.—*The nematode genus Raillietnema Travassos, 1927.*<sup>1</sup>  
A. C. WALTON, Knox College. (Communicated by E. W. PRICE.)

The genus *Raillietnema* was established by Travassos in 1927 for those species of cosmocercoid nematodes that show simple basically amphidelphic uteri, a small number of relatively large ova, a vulva opening posterior to the midregion of the body, a much simplified male reproductive structure, subequal spicules, and a very small accessory piece. *Oxysomatium simplex* Travassos, 1925—from *Hyla faber*, Brazil—was made the type species. In 1931 Travassos added *Aplectana loveridgei* Sandground, 1928—from *Scolecormorphus vittatus*, Africa—to the genus, and the present paper adds a third species. Semenow (1929) added *Oxyuris praeputialis* Skrjabin, 1916, to the genus, but this form lacks an accessory piece and has complex ovarian coils ending in uteri containing many eggs of relatively small size. As was pointed out earlier (Walton, 1933) this species must be excluded from the genus *Raillietnema* as it is now constituted.

Restudy of material believed to be *Raillietnema simplex* (from *Hyla faber*—Brazil) and *R. loveridgei* (from *Scolecormorphus unicolor*—Tanganyika Territory, Africa) supports the grouping of the two species into a single genus, and the finding of a third species with similar characteristics in *Scolecormorphus uluguruensis* (from Lyingwa, Tanganyika Territory, Africa) seems to justify the establishment of *Raillietnema* as a valid genus of the family Cosmocercidae.

***Raillietnema simplex* (Travassos, 1925) Travassos, 1927 Fig. 1**

Examination of both male and female material from the type host, *Hyla faber* (from Brazil), adds little to the original description except to point out that the male possesses very narrow caudal alae, which extend from just in front of the cloaca to a point midway along the length of the tail, and that these alae are supported by 4 of the 10 pairs of papillae characteristic of the species. Narrow lateral ridges are present in both sexes, extending from the anterior esophageal to the postanal region. This character is present in all three species of the genus. The excretory vesicle is heavily cuticularized, as it is in the other two species, but is characteristically cylindrical, not spherical, in form.

*Male*.—Length, 1.6–1.75 mm; greatest width, 0.076–0.082 mm; pharynx length, 0.029–0.032 mm; esophagus length, 0.37–0.405 mm; esophageal bulb measures 0.052–0.057 mm by 0.052–0.057 mm, with a neck 0.047–0.05 mm in length; head-nerve ring distance, 0.195–0.21 mm; head-excretory pore distance, 0.385–0.405 mm; cloaca-tail distance, 0.165–0.171 mm; spicule length, 0.218–0.221 mm; accessory piece length, 0.0159–0.0163 mm; caudal papillae arrangement, 2 pairs precloacal and 8 pairs postcloacal, with 1 pair of precloacals and 3 pairs of postcloacals supporting the caudal alae.

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One median unpaired precloacal papillus is present. Narrow lateral ridges extend almost the entire length of the body.

*Female*.—Length, 2.35–2.72 mm; width at vulva, 0.105–0.141 mm; pharynx length, 0.034–0.038 mm; esophagus length, 0.49–0.51 mm; esophageal bulb measures 0.07–0.072 mm by 0.07–0.072 mm, with a neck 0.05–0.053 mm in length; head-nerve ring distance, 0.245–0.251 mm; head-excretory pore distance, 0.48–0.51 mm; anus-tail distance, 0.22–0.245 mm; vulva-tail distance, 1.19–1.38 mm; larvated eggs measure 0.09–0.12 mm by 0.22–0.24 mm; 2–4 eggs in each uterus. Narrow lateral ridges along almost the entire length of the body.

*Host*.—*Hyla faber*—Brazil.

*Habitat*.—Large intestine and the lower end of the small intestine of the host.

***Raillietnema loveridgei* (Sandground, 1928) Travassos, 1931 Fig. 2**

Study of both male and female material collected from three specimens of *Scolecormorphus unicolor* (taken July 1939, at Magrotto Mountain, Tanganyika Territory, Africa) adds but little to the original description. Both sexes have narrow lateral ridges extending almost the entire length of the body, and the excretory vesicle of each is subspherical in shape. One pair of precloacal and one pair of postcloacal papillae support the caudal alae in the male; the third pair of papillae is postalar in position. The number of ova in each uterus is somewhat greater than in *R. simplex*, but is still relatively low.

*Male*.—Length, 1.81–2.01 mm; greatest width, 0.109–0.12 mm; pharynx length, 0.021–0.032 mm; esophagus length, 0.363–0.4 mm; esophageal bulb measures 0.055–0.08 mm by 0.055–0.08 mm, with a neck 0.06–0.07 mm in length; head-nerve ring distance, 0.145–0.15 mm; head-excretory pore distance, 0.326–0.363 mm; cloaca-tail distance, 0.07–0.08 mm; spicule length, 0.175–0.2 mm; accessory piece length, 0.035–0.039 mm; caudal papillae arrangement, one pair precloacal and two pairs postcloacal, with the last pair caudal to the alae. One median unpaired precloacal papillus is present. Narrow lateral ridges extend almost the entire length of the body.

*Female*.—Length, 2.141–3.025 mm; width at vulva, 0.127–0.15 mm; pharynx length, 0.024–0.03 mm; esophagus length, 0.34–0.42 mm; esophageal bulb measures 0.075–0.09 mm by 0.075–0.09 mm, with a neck 0.07–0.085 mm in length; head-nerve ring distance, 0.152–0.175 mm; head-excretory pore distance, 0.35–0.375 mm; anus-tail distance, 0.09–0.115 mm; vulva-tail distance, 0.6–0.95 mm; larvated eggs measure 0.076–0.1 mm by 0.14–0.16 mm; 6–7 eggs in each of the uteri. Narrow lateral ridges extend almost the entire length of the body.

*Hosts*.—*Scolecormorphus unicolor*, *S. vittatus*—Africa (Tanganyika Territory).

*Habitat*.—Large intestine of the host.

***Raillietnema multipapillata*, n. sp.**

Fig. 3

*Scolecormorphus uluguruensis* (taken at an altitude of 8,000 feet near Lyngwa, Tanganyika Territory, Africa, in October, 1926) is the host for a third species of *Raillietnema*. Both male and female specimens are available for study.

*Male*.—Length, 1.82–1.83 mm; greatest width, 0.09–0.1 mm; pharynx length, 0.027–0.03 mm; esophagus length, 0.33–0.345 mm; esophageal bulb measures 0.07–0.08 mm by 0.07–0.08 mm, with a neck 0.07–0.075 mm in

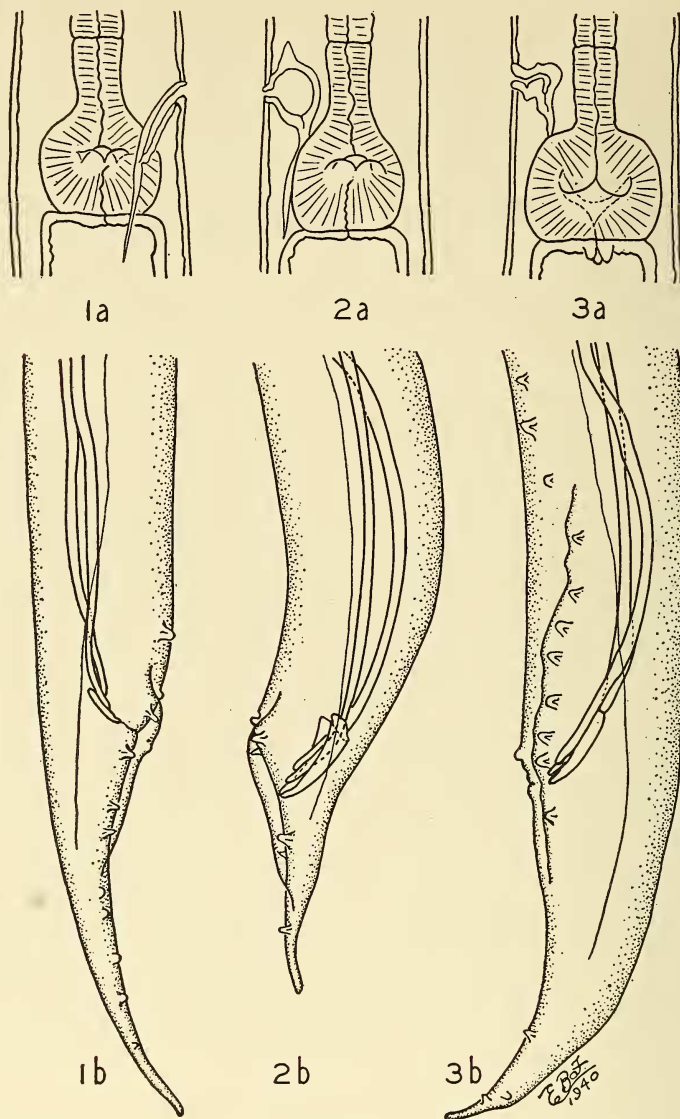


Fig. 1.—*Raillietnema simplex*: a, Esophageo-intestinal junction; b, lateral view of tail of male. Fig. 2. *Raillietnema loveridgei*: a, Esophageo-intestinal junction; b, lateral view of tail of male. Fig. 3. *Raillietnema multipapillata*: a, Esophageo-intestinal junction; b, lateral view of tail of male. (All drawn to the same scale.)

length; head-nerve ring distance, 0.17–0.178 mm; head-excretory pore distance, 0.28–0.3 mm; cloaca-tail distance, 0.12–0.13 mm; spicule length, 0.28–0.291 mm; accessory piece length, 0.036–0.041 mm; caudal papillae arrangement, 10 pairs precloacal and 4 pairs postcloacal, with 7 pairs of precloacals and 1 pair of postcloacals supporting the narrow caudal alae. One median unpaired precloacal papillus present. Narrow lateral ridges extend practically the entire length of the body.



*Female*.—Length, 2.582–2.702 mm; width at vulva, 0.232–0.261 mm; pharynx length, 0.033–0.037 mm; esophagus length, 0.36–0.4 mm; esophageal bulb measures 0.1–0.125 mm by 0.1–0.125 mm, with a neck 0.1–0.13 mm in length; head-nerve ring distance, 0.175–0.185 mm; head-excretory pore distance, 0.36–0.371 mm; anus-tail distance, 0.161–0.169 mm; vulva-tail distance, 1.075–1.092 mm; nonlarvated eggs measure 0.109–0.113 mm by 0.125–0.13 mm; 6–8 eggs in each of the uteri. Narrow lateral ridges extend almost the entire length of the body.

*Host*.—*Scolecophorus uluguruensis*—Tanganyika Territory, Africa.

*Habitat*.—Large intestine of host.

*Type specimens*.—Cotypes are deposited in the collections of the United States National Museum (no. 42090).

*Discussion*.—*Raillietnema multipapillata* may be separated from the other two members of the genus on the bases of: (1) A larger total number of caudal papilla, (2) by the greater number of papillae supporting the caudal alae, (3) by the larger number of smaller ova, (4) by the longer spicules, and (5) by the distinctive form of the heavily cuticularized excretory vesicle. *R. loveridgei* has the least number of caudal papillae and the shortest caudal alae, the shortest spicules, and the most complex accessory piece of the three species. The number of ova is intermediate and the excretory vesicle is sub-spherical in form. In *R. simplex* the number of caudal papillae and the size of the caudal alae increase, the spicules are longer, the accessory piece is much reduced, the number of ova is low, and the excretory vesicle is a short cylindrical structure. *R. magnipapillata* has the greatest number of caudal papillae, the longest caudal alae, the longest spicules, a large accessory piece of simple structure, a larger number of smaller ova, and an excretory vesicle shaped like a collapsed sphere with very heavy walls.

The genus *Raillietnema* at present consists of three species, two from African examples of the Apoda and one from a Brazilian tree frog. It seems to act as a connecting link between the cosmopolitan *Oxysomatium-Aplectana* group of quite complex species, on the one hand, and the extremely simplified, secondarily evolved, and geographically localized *Schrankia* species, on the other. The species of this latter genus are reported only from one species of *Leptodactylus* (*L. pentadactylus*) from Brazil. Only one or two eggs seem to mature at any one time in the members of the genus, and the number of spermatozoa is likewise greatly reduced. *Oxysomatium* appears to be nearer the original stem of the cosmocercoids, and from this base has evolved *Raillietnema* and then *Schrankia*. The reduction in the complexity of the reproductive systems is regarded as evidence of secondary, not primary, simplicity of the genera.

# LITERATURE CITED

- SANDGROUND, J. H. *Some new cestode and nematode parasites from Tanganyika Territory*. Proc. Bost. Soc. Nat. Hist. 39(4): 131–150, 6 pls. 1928.
- SEMENOW, W. D. *Beitrag zur Charakteristik des Nematoden Raillietnema praeputiale (Skrjabin, 1914)*. Zool. Anz. 86(5/8): 149–158, 5 pls.

- SKRJABIN, K. J. *Parasitic trematodes and nematodes collected by the expedition of Prof. V. Dogiel and I. Sokolow in British East Africa. Sci. Res. Zool. Exp. Br. E. Afr. and Uganda.* V. Dogiel and I. Sokolow, 1914 (English translation). 1: 99-157, 10 pls. 1916.
- TRAVASSOS, L. *Contribuições para o conhecimento da fauna helmintológica dos Batráquios do Brasil.* Trab. Inst. Oswaldo Cruz, Serv. San. Rur. Est. Rev., pp. 1-17, 10 figs. 1925.
- . *Schrankia brasili. Oxyuroidea de Batrachio.* Bol. Biol. 9: 147-152, 4 figs. 1927.
- . *Pesquisas helmintológicas realizadas em Hamburgo. IX. Ensaio monographico da familia Cosmocercidae Trav. 1925 (Nematoda).* Mem. Inst. Oswaldo Cruz. 25(3): 237-298, 43 pls. 1931.
- WALTON, A. C. *The Nematoda as parasites of Amphibia. I.* Journ. Parasitol. 20(1): 1-32, 1 pl. 1933.

ENTOMOLOGY.—*The North American empoascan leafhoppers of the alboneura group (Homoptera-Cicadellidae).*<sup>1</sup> NANCY H. WHEELER,<sup>2</sup> U. S. Bureau of Entomology and Plant Quarantine. (Communicated by J. S. WADE.)

In 1898, Gillette,<sup>3</sup> using external characters only, described the widely distributed American leafhopper *Empoasca alboneura*. At the same time he also described two other species of *Empoasca*, *mexicana* and *tumida*, having certain external characters similar to those of *alboneura*. In the revision of the genus *Empoasca*, DeLong<sup>4</sup> redescribed the external characters of *alboneura* and included a description and illustrations of the internal male genitalia of this species, pointing out that *tumida* was a synonym and placing *alboneura* next to *aspersa* in the subgenus *Hebata*. Later, DeLong and Davidson<sup>5</sup> described and illustrated *confusa*, which externally closely resembles *alboneura* but internally is quite distinct.

The most distinctive external characters of *alboneura* and closely related species are the more or less bluntly rounded crown and the pale nervures of the forewings, the latter, by contrast, giving to most of the species of this group a more or less striped appearance. The species are all rather robust and range from 2.5 to 3.3 mm in length. In size and shape they are somewhat similar to the species of the *aspersa* group,<sup>6</sup> but are of a duller green color and lack the mosaic pattern of the forewings that is characteristic of the *aspersa* group.

With a view to bringing together the various species of this rather homogeneous group, of which *alboneura* is considered typical, a care-

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<sup>3</sup> Proc. U. S. Nat. Mus. 20: 743-744. 1898.

<sup>4</sup> U. S. Dept. Agr. Tech. Bull. 231: 35. 1931.

<sup>5</sup> Ohio Journ. Sci. 36: 229. 1936.

<sup>6</sup> Proc. Ent. Soc. Washington 40: 133-147. 1938.